REMARKS

Claims 1-12 and 14-32 are currently pending in the present application. No claims have been amended or cancelled in the present response.

In the Office Action mailed June 9, 2005, claims 1-12, 14-21 and 28-32 were rejected. More specifically, the status of the claims in light of this Office Action is as follows:

(A) Claims 1, 8, 11, 12, 28 and 32 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. 2005/0016956 to Liu et al. ("Liu"); and

(B) Claims 2-7, 9, 10, 14-21 and 29-31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Liu.

As a preliminary matter, the Examiner alleges that claims 22-27 are drawn to a non-elected species. The undersigned attorney respectfully disagrees. In an Office Action mailed March 22, 2005, the Examiner requested an election of one of the following species:

(A) Species I, the difference between the first and second enclosure pressures is at least 90%;

(B) Species II, allowing at least a monolayer of the first precursor gas to be absorbed on the surfaces; first flow rate 250 sccm; and second flow rate 1000 sccm; and

(C) Species III, a microfeature workpiece processing system with a programmable controller operatively coupled to the gas supply and the vacuum.

In response, the applicants elected Species I. Claims 22-25 read on Species I, and claims 26 and 27 are generic to Species I and II. Accordingly, the undersigned attorney respectfully requests that the Examiner rejoin and examine claims 22-27.

A. Response to the Section 102(e) Rejection

Claims 1, 8, 11, 12, 28 and 32 were rejected under 35 U.S.C. § 102(e) as being anticipated by Liu. As described below, Liu fails to disclose or suggest all the features of these claims.

1. Claim 1 Is Directed to a Method of Depositing a Material on a Plurality of Workpieces Including Introducing a Flow of a Purge Gas Into an Enclosure at a First Flow Rate and Increasing the Flow Rate of the Purge Gas to a Second Flow Rate Greater Than the First Flow Rate

Claim 1 is directed to a method of depositing a material on a plurality of microfeature workpieces held in a spaced relationship within an enclosure of a processing system. The enclosure includes a first precursor gas and has a first enclosure pressure. The method includes reducing pressure within the enclosure to a second enclosure pressure while introducing a flow of a purge gas into the enclosure at a first flow rate. The second enclosure pressure is less than the first enclosure pressure, and the processing system has a base pressure at the first flow rate. The difference between the first and second enclosure pressures is at least 90% of the difference between the first enclosure and base pressures. After reducing the pressure within the enclosure to the second enclosure pressure, the method further includes increasing the flow rate of the purge gas to a second flow rate and increasing the pressure within the enclosure to a third enclosure pressure. The second flow rate is greater than the first flow rate, and the third enclosure pressure is greater than the second enclosure pressure.

2. Liu Discloses Conventional ALD Processing Methods in which the Purge Gas Has a Constant Flow Rate

According to Liu, conventional ALD processing methods include flowing a purge gas flow into a reactor at a constant rate and periodically injecting precursors into the reactor. Because the purge gas has a constant flow rate throughout the ALD cycle, the pressure within the reactor increases when the precursors are intermittently injected into the reactor, and the pressure within the reactor decreases after the excess

precursor molecules are exhausted from the reactor, as illustrated in Figures 3A and 3B.

3. Liu Fails to Disclose or Suggest a Method for Depositing a Material on a Plurality of Workpieces Including Reducing Pressure Within the Enclosure While Introducing a Flow of a Purge Gas Into the Enclosure at a First Flow Rate and After Reducing the Pressure, Increasing the Flow Rate of the Purge Gas to a Second Flow Rate to Increase the Pressure

Liu fails to disclose or suggest a method of depositing a material onto a plurality of microfeature workpieces including, *inter alia*, "reducing pressure within the enclosure to a second enclosure pressure while introducing a flow of a purge gas into the enclosure at a first flow rate," and "after reducing the pressure within the enclosure to the second enclosure pressure, increasing flow rate of the purge gas to a second flow rate and increasing the pressure within the enclosure to a third enclosure pressure, the second flow rate being greater than the first flow rate and the third enclosure pressure being greater than the second enclosure pressure," as recited in claim 1. The applicants do not concede to the characterization of Liu in the Office Action, but even if the second half of the time period T_5 (illustrated in Figure 3B) of Liu's ALD cycle and the first part of the time period T_7 (illustrated in Figure 3B) of Liu's ALD cycle correspond to the reducing pressure and increasing pressure elements, respectively, of claim 1 as suggested by the Examiner, then the flow rate of the purge gas during time period T_5 is not less than the flow rate of the purge gas during time period T_7. Rather, as illustrated in Figure 3A, the purge gas has a constant flow rate throughout Liu's ALD cycle. Moreover, one of ordinary skill in the art would not be motivated to increase the flow rate of the purge gas during the first part of the time period T_7 (while the second precursor is injected into the reactor) because such a modification would remove many of the second precursor molecules from the reactor before the molecules could react with the first precursor on the wafer. Accordingly, Liu fails to disclose or suggest introducing a flow of a purge gas into the enclosure at a first flow rate and increasing the flow rate of the purge gas to a second flow rate greater than the first flow rate. Therefore, the Section 102(e) rejection of claim 1 should be withdrawn.

Claims 8, 11 and 12 depend from claim 1. Accordingly, the Section 102(e) rejection of claims 8, 11 and 12 should be withdrawn for the reasons discussed above with reference to claim 1 and for the additional features of these claims.

4. Claim 28 Is Directed to a Method of Depositing a Material on a Plurality of Workpieces Including (a) Introducing a Flow of a Purge Gas and Increasing the Pressure Within an Enclosure to a Third Enclosure Pressure, and (b) Introducing a Flow of a Second Precursor Into the Enclosure With the Pressure in the Enclosure at a Fourth Enclosure Pressure, Wherein the Difference Between the Third and Fourth Pressures Is About 0-10% of the Fourth Pressure

Claim 28 is directed to a method of depositing a material on a plurality of microfeature workpieces held in a spaced relationship within an enclosure of a processing system. The enclosure includes a first precursor gas and has a first enclosure pressure. The method includes reducing pressure within the enclosure to a second enclosure pressure that is less than the first enclosure pressure. The processing system has a base pressure, and the difference between the first and second enclosure pressures is at least 90% of the difference between the first enclosure and base pressures. After reducing the pressure within the enclosure to the second enclosure pressure, the method further includes introducing a flow of a purge gas into the enclosure and increasing the pressure within the enclosure to a third enclosure pressure greater than the second enclosure pressure. After increasing the pressure within the enclosure to the third enclosure pressure, the method further includes introducing a flow of a second precursor gas to the enclosure with the pressure within the enclosure at a fourth enclosure pressure. The difference between the third and fourth enclosure pressures is about 0-10% of the fourth enclosure pressure.

5. Liu Fails to Disclose or Suggest a Method of Depositing a Material on a Plurality of Workpieces Including (a) Introducing a Flow of a Purge Gas and Increasing the Pressure Within an Enclosure to a Third Enclosure Pressure, and (b) Introducing a Flow of a Second Precursor Into the Enclosure With the Pressure in the Enclosure at a Fourth Enclosure Pressure, Wherein the Difference Between the Third and Fourth Pressures Is About 0-10% of the Fourth Pressure

Liu fails to disclose or suggest a method of depositing a material onto a plurality of workpieces including, *inter alia*, "introducing a flow of a purge gas into the enclosure

and increasing the pressure within the enclosure to a third enclosure pressure," and "after increasing the pressure within the enclosure to the third enclosure pressure, introducing a flow of a second precursor gas to the enclosure with the pressure within the enclosure at a fourth enclosure pressure, a difference between the third enclosure pressure and the fourth enclosure pressure being about 0-10% of the fourth enclosure pressure," as recited in claim 28. The applicants do not concede to the characterization of Liu in the Office Action, but even if the pressures at time periods T_5 and T_7 in Liu's ALD cycle correspond to the third and fourth enclosure pressures, respectively, of claim 28 as suggested by the Examiner, then the difference between the pressures at time periods T_5 and T_7 is not about 0-10% of the pressure at time period T_7. Rather, the pressure during time period T_5 appears to be significantly less than the pressure during time period T_7 because the pressure during the time period T_5 is due solely to the flow of purge gas into the reactor and the pressure during time period T_7 is due to the flow of both precursor gas and purge gas into the reactor. Moreover, one of ordinary skill in the art would not be motivated to modify Liu's method to reduce the flow of precursor gas into the reactor and thereby reduce the difference between the two pressures at time periods T_5 and T_7, respectively, because such a modification would increase the time required to deposit material onto the wafer. Accordingly, Liu fails to disclose or suggest all the elements of claim 28. Therefore, the Section 102(e) rejection of claim 28 should be withdrawn.

Claim 32 depends from claim 28. Accordingly, the Section 102(e) rejection of claim 32 should be withdrawn for the reasons discussed above with reference to claim 28 and for the additional features of this claim.

B. Response to the Section 103(a) Rejection

Claims 2-7, 9, 10, 14-21 and 29-31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Liu. Claims 2-7, 9 and 10 depend from claim 1. Accordingly, the Section 103(a) rejection of these claims should be withdrawn for the reasons discussed above with reference to claim 1 and for the additional features of these claims.

Claims 14-17 and 19-21 depend from claim 18. Accordingly, the Section 103(a) rejection of these claims should be withdrawn for the reasons described below with reference to claim 18 and for the additional features of these claims.

Independent claim 18 has, *inter alia*, features generally analogous to those of claim 1. Accordingly, the Section 103(a) rejection of claim 18 should be withdrawn for the reasons discussed above with reference to claim 1 and for the additional features of this claim.

Claims 29-31 depend from claim 28. Accordingly, the Section 103(a) rejection of these claims should be withdrawn for the reasons discussed above with reference to claim 28 and for the additional features of these claims.

C. Conclusion

In view of the foregoing, the claims pending in the application comply with the requirements of 35 U.S.C. § 112 and patentably define over the applied art. A Notice of Allowance is, therefore, respectfully requested. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-6465.

Respectfully submitted,
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Date: Sept. 9, 2005

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